WHAT IS CLAIMED IS:

1. A tunable laser, comprising:

an actuator to drive a tuning element of a tunable laser;

a multiple bandwidth mode controller comprising a high bandwidth mode and a lower bandwidth mode,

said controller to initially drive said actuator in said high bandwidth mode and switch to said lower bandwidth mode when an error signal associated with a target frequency is within a threshold range.

2. The tunable laser as recited in claim 1, wherein said tuning element comprises a thermo electric cooler (TEC).

3. The tunable laser as recited in claim 1 wherein said tuning element comprises one of etalons and filters.

4. The tunable laser as recited in claim 1 wherein said high bandwidth mode drives said actuator with a first power level and said lower bandwidth mode drives said actuator with a second power level, said first power level greater than said second power level.

5. The tunable laser as recited in claim 4 wherein said first power level comprises higher power and said second power level comprises lower power.

6. The tunable laser as recited in claim 4 wherein said error signal is derived from a dither signal to an optical path length modulating element.

7. The tunable laser as recited in claim 6 wherein said optical path length modulating element comprises a Lithium Niobate ($LiNbO_3$) phase modulator.

8. The tunable laser as recited in claim 1 wherein said controller in said high bandwidth mode comprises a Bang Bang controller or an open loop controller.

9. The tunable laser as recited in claim 1 wherein said controller comprises one of a lead/lag controller and a Proportional Integral Derivative (PID) controller.

10. A method of tuning a laser, comprising:

dithering a cavity length of said laser to produce a transmission peak error signal for a target frequency;

driving an actuator at a first power level to move said error signal towards zero;

driving said actuator at a second power level, less than said first power level, when said error signal is with a threshold range near zero.

11. The method as recited in claim 10 wherein said dithering comprises supplying a voltage signal to a phase modulator to modulate a cavity length of said laser.

12. The method as recited in claim 11 wherein said voltage signal comprises about a sinewave signal at a constant frequency.

13. The method as recited in claim 10 wherein driving said actuator comprises changing a temperature of a thermoelectric cooler (TEC).

14. The method as recited in claim 10 wherein driving said actuator comprises tuning one of an etalon or a filter.

15. A system, comprising:

an external cavity diode laser (ECDL);

an actuator to drive a tuning element of said ECDL;

a multiple bandwidth mode controller comprising a high bandwidth mode for seeking a new target frequency and a lower bandwidth mode for tracking the target frequency,

said controller to initially drive said actuator in said high bandwidth mode and then in said lower bandwidth mode when an error signal associated with a target frequency is within a threshold range.

16. The system as recited in claim 15, wherein said tuning element comprises a thermo electric cooler (TEC).

17. The system as recited in claim 15 wherein said tuning element comprises one of etalons and filters.

18. The system as recited in claim 15 wherein said high bandwidth mode drives said actuator with a first power level and said lower bandwidth mode drives said actuator with a second power level, said first power level greater than said second power level.

19. The system as recited in claim 18 wherein said first power level comprises a higher power and said second power level comprises a lower power.

20. The system as recited in claim 15 wherein said error signal is derived from a dither signal to an optical path length modulating element.

21. The system as recited in claim 20 wherein said optical path length modulating element comprises a Lithium Niobate ($LiNbO_3$) phase modulator.

22. The system as recited in claim 15 wherein said controller comprises a Bang-Bang controller or other open loop controller in said high bandwidth mode.

23. The system as recited in claim 15 wherein said controller comprises one of a lead/lag controller and a Proportional Integral Derivative (PID) controller.